

Amendments to the Claims

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of Claims:

1. (CURRENTLY AMENDED) An image display device, comprising:

a plurality of pixels disposed in a matrix;

a display section, having a plurality of data signal lines for respective columns of the plurality of pixels and having a plurality of scanning signal lines corresponding to respective rows of the plurality of pixels, for displaying an image by writing a video signal from each data signal line into each pixel in synchronism with a scanning signal which is outputted from each scanning signal line;

a data signal line driving circuit for outputting the video signal to the plurality of data signal lines;

a scanning signal line driving circuit for outputting the scanning signal to the plurality of scanning signal lines;

a pre-charging circuit for writing a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time; and

wherein a pre-charging voltage stabilizing section for stabilizing a pre-charging voltage and supplying the stabilized pre-charging voltage as said pre-charging voltage to the pre-charging circuit, so as to suppress fluctuation in said pre-charging voltage is provided on a preceding stage of said pre-charging circuit; and

_____ wherein said pre-charging voltage stabilizing section includes current controlling means composed of a resistor and charge holding means composed of a capacitance, where charge is supplied from the charge holding means when the pre-charging control signal is working and pre-charge voltage supplied from the control signal generating circuit is applied to the charge holding means while the pre-charging control signal is not working, and current controlling means is used.

2. (CANCELED)

3. (CANCELED)

4. (CANCELED)

5. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 3~~ claim 1, wherein:

said charge holding means has a capacitance which is at least larger than a total capacitance of said plurality of data signal lines.

6. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 2~~ claim 1, wherein:

when said pre-charging voltage is an AC voltage, time constants of said current controlling means and charge holding means making up said pre-charging voltage stabilizing

section are shorter than a duration of time from switching of polarity of said pre-charging voltage to next activation of said pre-charge control signal.

7. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 2~~ claim 1,
wherein:

when said pre-charging voltage is an AC voltage, time constants of said current controlling means and charge holding means making up said pre-charging voltage stabilizing section are shorter than a duration of time from activation of said pre-charging control signal to next activation thereof.

8. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 2~~ claim 1,
wherein:

when said pre-charging voltage is an AC voltage, said current controlling means and charge holding means making up said pre-charging voltage stabilizing section are arranged to stabilize said pre-charging voltage to a sufficient potential within a period of said pre-charging control signal.

9. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 2~~ claim 1,
wherein:

when said pre-charging voltage is a DC voltage, said current controlling means and charge holding means making up said pre-charging voltage stabilizing section are arranged to

sufficiently stabilize said pre-charging voltage during a period from feeding power to starting display.

10. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 2~~ claim 1, wherein:

when said pre-charging voltage is a DC voltage, said current controlling means and charge holding means making up said pre-charging voltage stabilizing section are arranged to supply more charges than charges supplied to said data signal lines by said pre-charging voltage from said pre-charging circuit within a period of the pre-charging control signal.

11. (CURRENTLY AMENDED) A driving method of an image display device, said device comprising:

a plurality of pixels disposed in a matrix;

a display section, having a plurality of data signal lines for respective columns of the plurality of pixels and having a plurality of scanning signal lines corresponding to respective rows of the plurality of pixels, for displaying an image by writing a video signal from each data signal line into each pixel in synchronism with a scanning signal which is outputted from each scanning signal line;

a data signal line driving circuit for outputting said video signal to said plurality of data signal lines;

a scanning signal line driving circuit for outputting said scanning signal to said plurality of scanning signal lines;

a pre-charging circuit for writing a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time; and

said driving method comprising the step of supplying said pre-charging voltage to a pre-charging voltage stabilizing section which is composed of current controlling means and charge holding means and is provided on a preceding stage of said pre-charging circuit, said pre-charging voltage having an AC voltage in synchronism with one horizontal period of said video signal; and

wherein charge is supplied from the charge holding means when the pre-charging control signal is working and pre-charge voltage supplied from the control signal generating circuit is applied to the charge holding means while the pre-charging control signal is not working, and current controlling means is used.

12. (ORIGINAL) The driving method of the image display device as set forth in claim 11, wherein:

said pre-charging voltage has a polarity opposite to that of said video signal.

13. (ORIGINAL) The driving method of the image display device as set forth in claim 11, wherein:

said pre-charging voltage has an AC voltage which is equipotential from maximum amplification values of positive and negative polarities of said video signal.

14. (CURRENTLY AMENDED) A driving method of an image display device, said device comprising:

a plurality of pixels disposed in a matrix;

a display section, having a plurality of data signal lines for respective columns of the plurality of pixels and having a plurality of scanning signal lines corresponding to respective rows of the plurality of pixels, for displaying an image by writing a video signal from each data signal line into each pixel in synchronism with a scanning signal which is outputted from each scanning signal line;

a data signal line driving circuit for outputting said video signal to said plurality of data signal lines;

a scanning signal line driving circuit for outputting said scanning signal to said plurality of scanning signal lines; and

a pre-charging circuit for writing a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time; and

said driving method comprising the step of supplying said pre-charging voltage to a pre-charging voltage stabilizing section which is composed of current controlling means and charge holding means and is provided on a preceding stage of said pre-charging circuit, said pre-charging voltage having a DC voltage in synchronism with one horizontal period of said video signal,

wherein charge is supplied from the charge holding means when the pre-charging control signal is working and pre-charge voltage supplied from the control signal generating circuit is applied to the charge holding means while the pre-charging control signal is not working, and current controlling means is used.

15. (ORIGINAL) The driving method of the image display device as set forth in claim 14, wherein:

said pre-charging voltage has a DC voltage which is equipotential from maximum amplification values of positive and negative polarities of said video signal.

16. (CURRENTLY AMENDED) An image display device which displays an image by writing a video signal with respect to a plurality of pixels disposed in a matrix via a plurality of data signal lines, comprising:

a pre-charging circuit for writing a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time before said video signal is written into said data signal lines; and

a pre-charging voltage stabilizing circuit for stabilizing said pre-charging voltage so as to supply charges to said pre-charging circuit by said pre-charging voltage, the charges being not less than an amount of charges which was supplied to said data signal lines by said pre-charging circuit; and

wherein said pre-charging voltage stabilizing circuit includes current controlling means composed of a resistor and charge holding means composed of a capacitance, where charge is supplied from the charge holding means when the pre-charging control signal is working and pre-charge voltage supplied from the control signal generating circuit is applied to the charge holding means while the pre-charging control signal is not working, and current controlling means is used.

17. (CANCELED) The image display device as set forth in claim 16, wherein:

said pre-charging voltage stabilizing circuit includes serially connected resistor and capacitor, and said capacitor supplies said pre-charging circuit with said charges.

18. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 17~~ claim 16, wherein:

when said pre-charging voltage is an AC voltage, time constants according to said resistor and capacitor are shorter than a duration of time from switching of polarity of said pre-charging voltage to next activation of said pre-charging control signal.

19. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 17~~ claim 16,
wherein:

when said pre-charging voltage is an AC voltage, time constants according to said resistor and capacitor are shorter than a duration of time from activation of said pre-charging control signal to next activation thereof.

20. (CURRENTLY AMENDED) The image display device as set forth in ~~claim 17~~ claim 16,
wherein:

when said pre-charging voltage is a DC voltage, time constants according to said resistor and capacitor provide time sufficient to stabilize said pre-charging voltage during a period from feeding power to starting said display.

21. (CURRENTLY AMENDED) A driving method of an image display device, said device comprising:

a plurality of pixels disposed in a matrix;

a display section, having a plurality of data signal lines for respective columns of the plurality of pixels and having a plurality of scanning signal lines corresponding to respective rows of the plurality of pixels, for displaying an image by supplying a video signal from each data signal line to each pixel in correspondence with a scanning signal which is supplied from each scanning signal line;

a data signal line driving circuit for outputting a video signal to the plurality of data signal lines in synchronism with a predetermined timing signal;

a scanning signal line driving circuit for outputting a scanning signal to the plurality of scanning signal lines by a pulse width control signal which controls an output signal in synchronism with a scanning start signal and a scanning timing signal, and a signal width of the output signal;

a pre-charging circuit for writing a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time;

pre-charging voltage stabilizing means for stabilizing a pre-charging voltage from the pre-charging circuit; and

a control signal generating circuit for supplying the circuits with a control signal so as to control operations thereof,

said driving method comprising the step of suspending a scanning signal for a predetermined period of time when a pre-charging voltage stabilizing circuit having charge holding means and current controlling means as the pre-charging voltage stabilizing means is used to perform display at fixed brightness in first and second display areas which are respectively provided corresponding to a first portion and/or a second portion on a screen of the display section by a pre-charging voltage inputted from the pre-charging circuit,

wherein charge is supplied from the charge holding means when the pre-charging control signal is working and pre-charge voltage supplied from the control signal generating circuit is

applied to the charge holding means while the pre-charging control signal is not working, and current controlling means is used.

22. (ORIGINAL) The driving method of the image display device as set forth in claim 21, wherein:

input of the scanning signal start signal to the scanning signal line driving circuit is suspended for a predetermined period of time so as to suspend the scanning signal.

23. (ORIGINAL) The driving method of the image display device as set forth in claim 21, wherein:

input of the scanning start signal and the scanning timing signal to the scanning signal line driving circuit is suspended for the predetermined period of time so as to suspend the scanning signal.

24. (ORIGINAL) The driving method of the image display device as set forth in claim 21, wherein

input of the scanning timing signal to the scanning signal line driving circuit and the pulse width control signal are suspended for the predetermined period of time so as to suspend the scanning signal.

25. (ORIGINAL) The driving method of the image display device as set forth in claim 21,
wherein:

the predetermined period of time is not less than a time constant of current controlling means and charge holding means which form the pre-charging voltage stabilizing circuit.

26. (ORIGINAL) The driving method of the image display device as set forth in claim 22,
wherein:

the predetermined period of time is not less than a time constant of current controlling means and charge holding means which form the pre-charging voltage stabilizing circuit.

27. (ORIGINAL) The driving method of the image display device as set forth in claim 23,
wherein:

the predetermined period of time is not less than a time constant of current controlling means and charge holding means which form the pre-charging voltage stabilizing circuit.

28. (ORIGINAL) The driving method of the image display device as set forth in claim 24,
wherein:

the predetermined period of time is not less than a time constant of current controlling means and charge holding means which form the pre-charging voltage stabilizing circuit.

29. (ORIGINAL) The driving method of the image display device as set forth in claim 21,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

30. (ORIGINAL) The driving method of the image display device as set forth in claim 22,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

31. (ORIGINAL) The driving method of the image display device as set forth in claim 23,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

32. (ORIGINAL) The driving method of the image display device as set forth in claim 24,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

33. (ORIGINAL) The driving method of the image display device as set forth in claim 25,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

34. (ORIGINAL) The driving method of the image display device as set forth in claim 26,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

35. (ORIGINAL) The driving method of the image display device as set forth in claim 27,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

36. (ORIGINAL) The driving method of the image display device as set forth in claim 28,
wherein:

the predetermined period of time is not less than time required for sufficiently stabilizing
the pre-charging voltage.

37. (CURRENTLY AMENDED) An image display device, comprising:

a plurality of pixels disposed in a matrix;

a display section, having a plurality of data signal lines for respective columns of the plurality of pixels and having a plurality of scanning signal lines corresponding to respective rows of the plurality of pixels, for displaying an image by supplying a video signal from each data signal line to each pixel in correspondence with a scanning signal which is supplied from each scanning signal line;

a data signal line driving circuit for outputting a video signal to the plurality of data signal lines in synchronism with a predetermined timing signal;

a scanning signal line driving circuit for outputting a scanning signal to the plurality of scanning signal lines by a pulse width control signal which controls an output signal in synchronism with a scanning start signal and a scanning timing signal, and a signal width of the output signal;

a pre-charging circuit for writing a pre-charging voltage inputted in synchronism with a pre-charging control signal into the plurality of data signal lines in a predetermined period of time;

pre-charging voltage stabilizing means for stabilizing a pre-charging voltage from the pre-charging circuit; and

a control signal generating circuit for supplying the circuits with a control signal so as to control operations thereof,

wherein:

the pre-charging voltage stabilizing means includes a pre-charging voltage stabilizing circuit having charge holding means and current controlling means, where charge is supplied from the charge holding means when the pre-charging control signal is working and pre-charge voltage supplied from the control signal generating circuit is applied to the charge holding means while the pre-charging control signal is not working, and current controlling means is used, and

in a non-match image display mode, one portion of the display section is set as a video data non-display area which avoids display of video data,

said image display device, further comprising:

a control signal generating section for suspending a scanning signal for a predetermined period of time is provided in the control signal generating circuit, when performing display at fixed brightness in the video data non-display area by a pre-charging voltage inputted from the pre-charging circuit.

38. (ORIGINAL) The image display device as set forth in claim 37, wherein the predetermined period of time is not less than a time constant of current controlling means and charge holding means which form the pre-charging voltage stabilizing circuit.

39. (ORIGINAL) The image display device as set forth in claim 37, wherein the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are formed on a single substrate.

40. (ORIGINAL) The image display device as set forth in claim 38, wherein the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are formed on a single substrate.

41. (ORIGINAL) The image display device as set forth in claim 37, wherein a switching element composing the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels is made of a polycrystalline silicon thin film transistor.

42. (ORIGINAL) The image display device as set forth in claim 38, wherein a switching element composing the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels is made of a polycrystalline silicon thin film transistor.

43. (ORIGINAL) The image display device as set forth in claim 39, wherein a switching element composing the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels is made of a polycrystalline silicon thin film transistor.

44. (ORIGINAL) The image display device as set forth in claim 40, wherein a switching element composing the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels is made of a polycrystalline silicon thin film transistor.

45. (ORIGINAL) The image display device as set forth in claim 37, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

46. (ORIGINAL) The image display device as set forth in claim 38, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

47. (ORIGINAL) The image display device as set forth in claim 39, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

48. (ORIGINAL) The image display device as set forth in claim 40, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

49. (ORIGINAL) The image display device as set forth in claim 41, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

50. (ORIGINAL) The image display device as set forth in claim 42, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

51. (ORIGINAL) The image display device as set forth in claim 43, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

52. (ORIGINAL) The image display device as set forth in claim 44, wherein switching elements which respectively form the pre-charging circuit, the data signal line driving circuit, the scanning signal line driving circuit and the pixels are manufactured at a process temperature of not more than 600 °C.

REMARKS